

NASA TECH BRIEF



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Simple Test for Physical Stability of Cryogenic Tank Insulation

A simple qualitative test has been devised for determining the ability of insulation liners used on liquid hydrogen tanks to withstand the tremendous stresses produced by the thermal shocks imparted to the insulation during filling and drainage of the tanks. This test effectively duplicates the stresses tending to rupture or debond the insulation when it is in service on an actual tank wall.

Specimens of the insulation composite to be tested are bonded to plates of a metal having a very low coefficient of thermal expansion (e.g., Invar) and the units are immersed in a cryostat containing liquid hydrogen for approximately 5 minutes. The test units are then removed from the cryostat and kept at room temperature for a least 5 minutes. This procedure of thermally shocking the specimens is repeated for 10 cycles. The number of cracks and the extent of damage on the insulation composites are visually observed and recorded at the end of each cycle.

Note:

1. This procedure is recommended as a rapid, inexpensive preliminary screening test for evaluation of cryogenic insulation composites.
2. Details concerning this test may be obtained from:
Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B68-10048

Patent status:

No patent action is contemplated by NASA.

Source: D. Rossello
of Douglas Aircraft Company
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